
بسم الله الرحمن الرحيم
السلام عليكم ورحمة الله وبركاته

Challenges of the agricultural sector under conditions of climate change

Prepared by

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Soils, Water and Environment Research Institute (SWERI),

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Contents

- Brief on the current situation of agriculture in Egypt
- Challenges facing the agricultural sector
- Contribution of the agricultural sector to the phenomenon of climate change
- Impact of climate change on agriculture sector

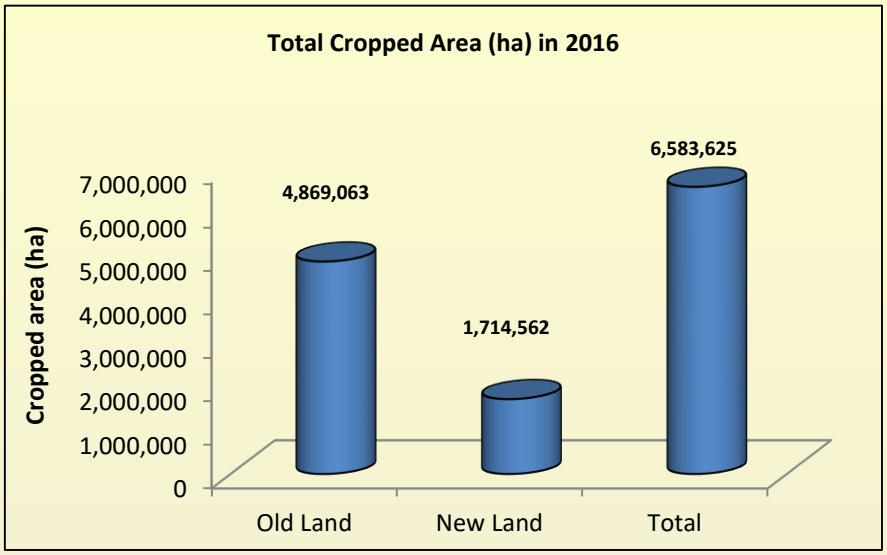
Egyptian Agriculture Sector “Overview”

Contributes to GDP 14 %

and 20 % of the country's exports.

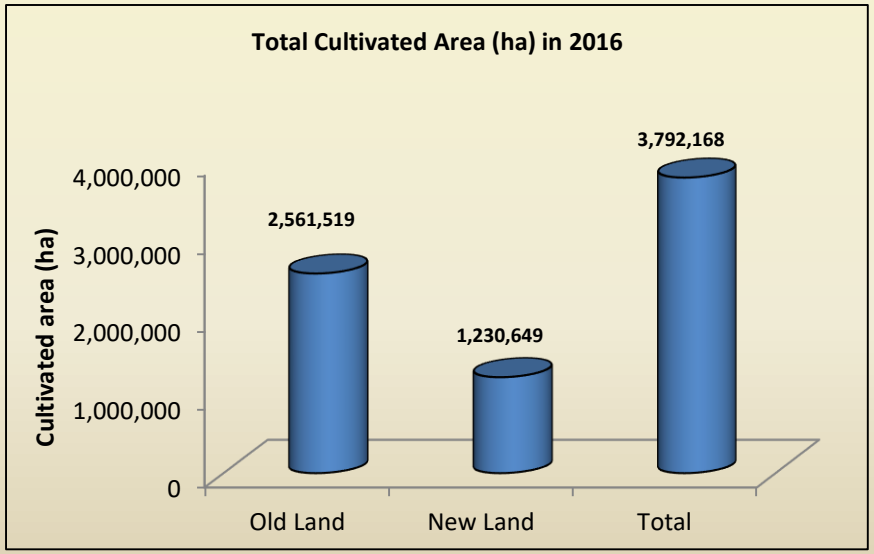
Work force

30 %

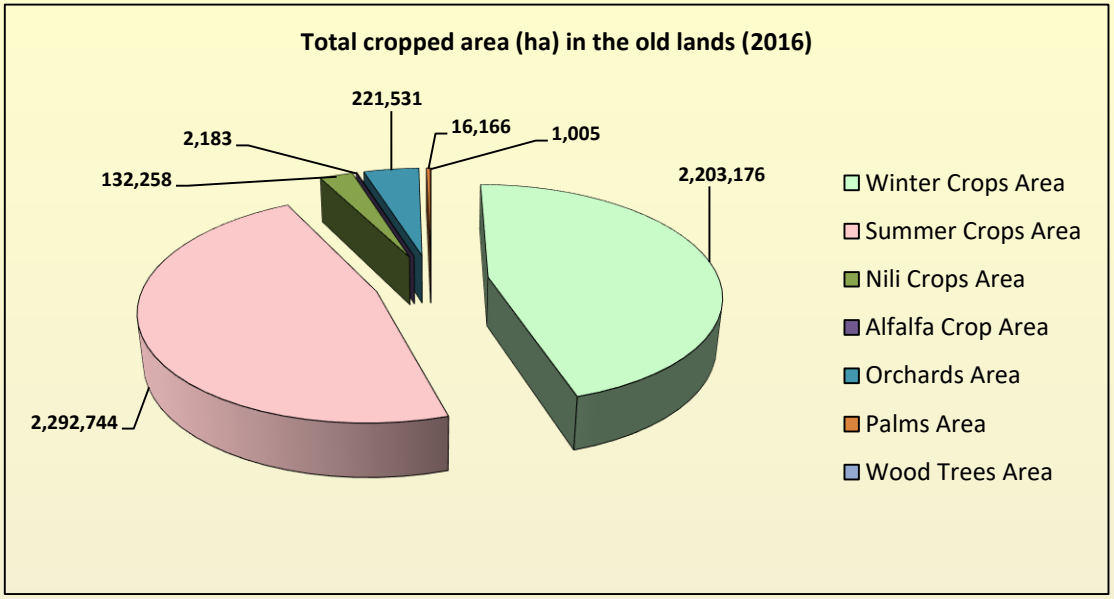


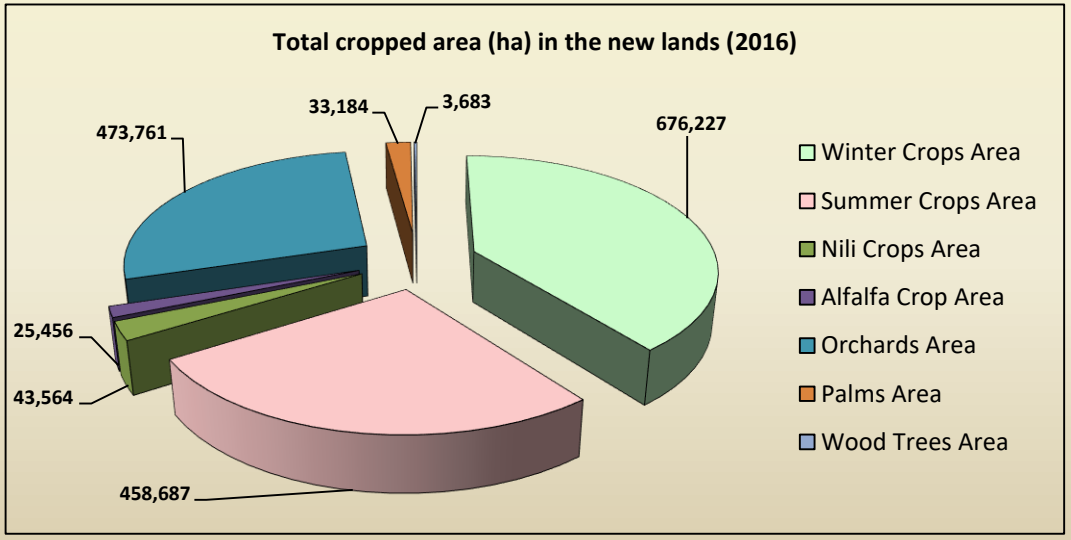
Total cropped area (ha) in 2016 = 6,583,625 ha (15,800,699 fa)

Total cultivated area (ha) in 2016 = 3,792,168 ha (9,101,204 fa)

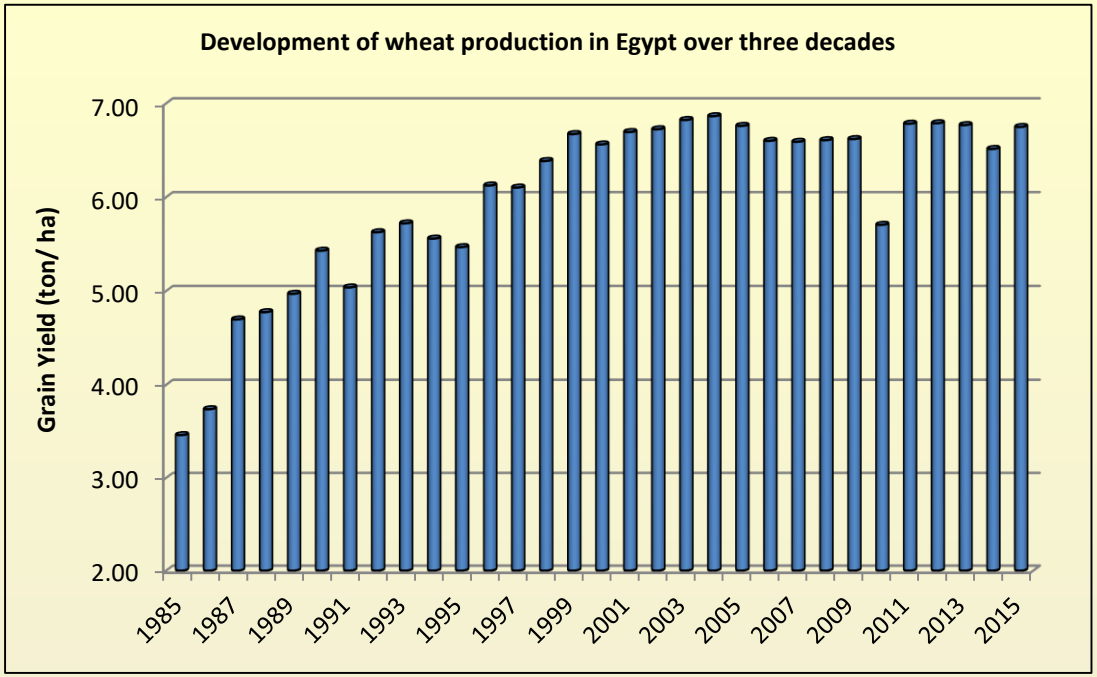


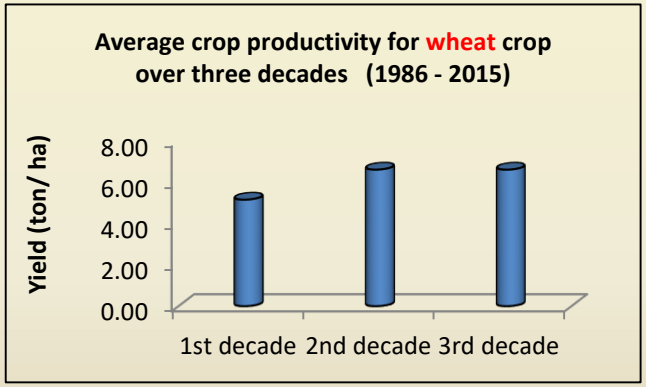
Source: Ministry of Agriculture and Land Reclamation – Economic Affairs Sector – Bulletin of The Agricultural Statistics, 2016

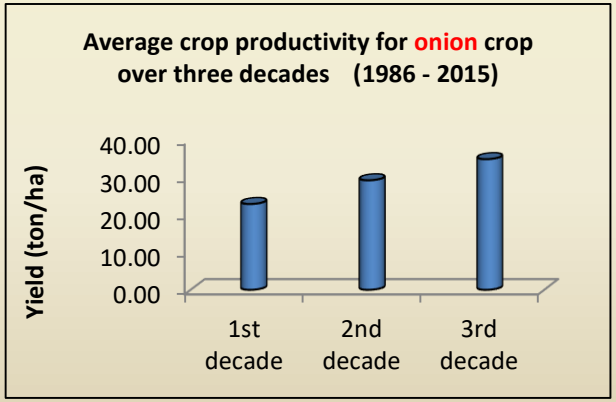


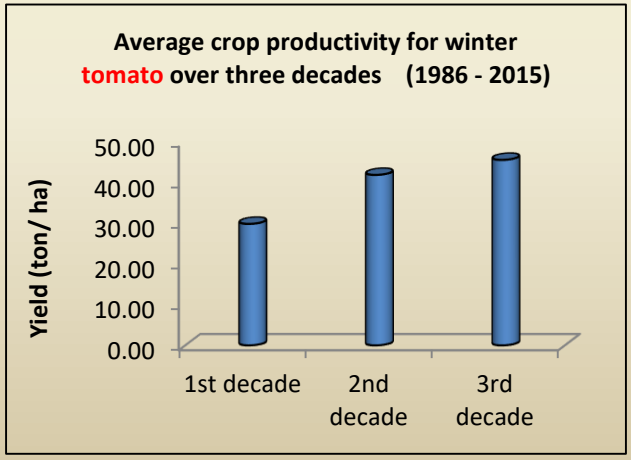


Source: Ministry of Agriculture and Land Reclamation – Economic Affairs Sector – Bulletin of The Agricultural Statistics , 2016

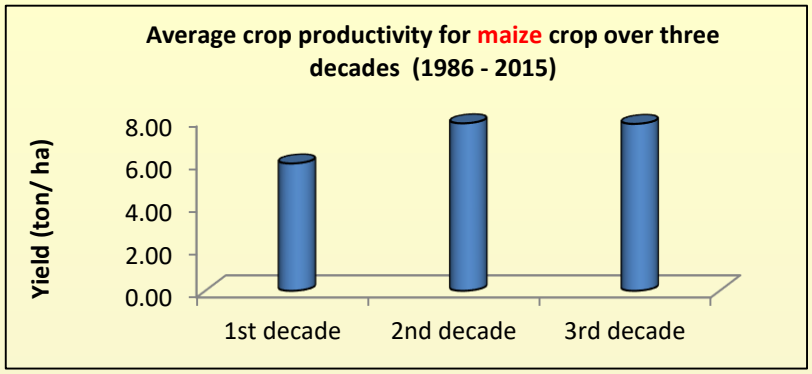


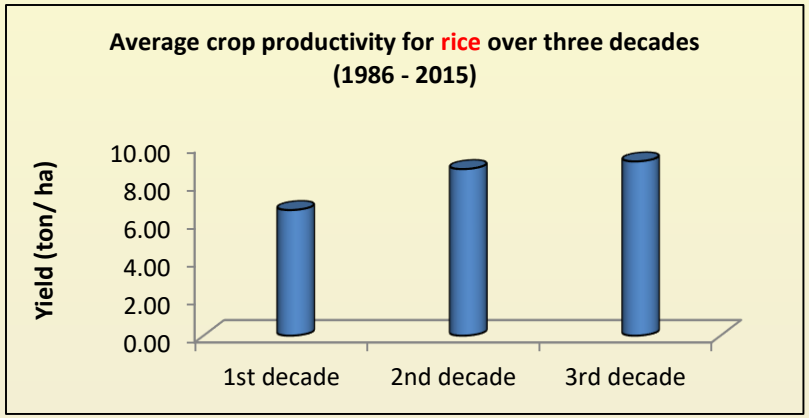


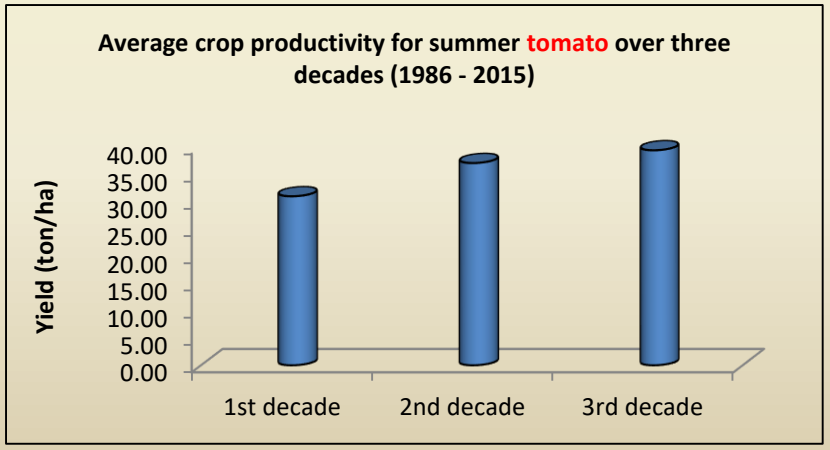




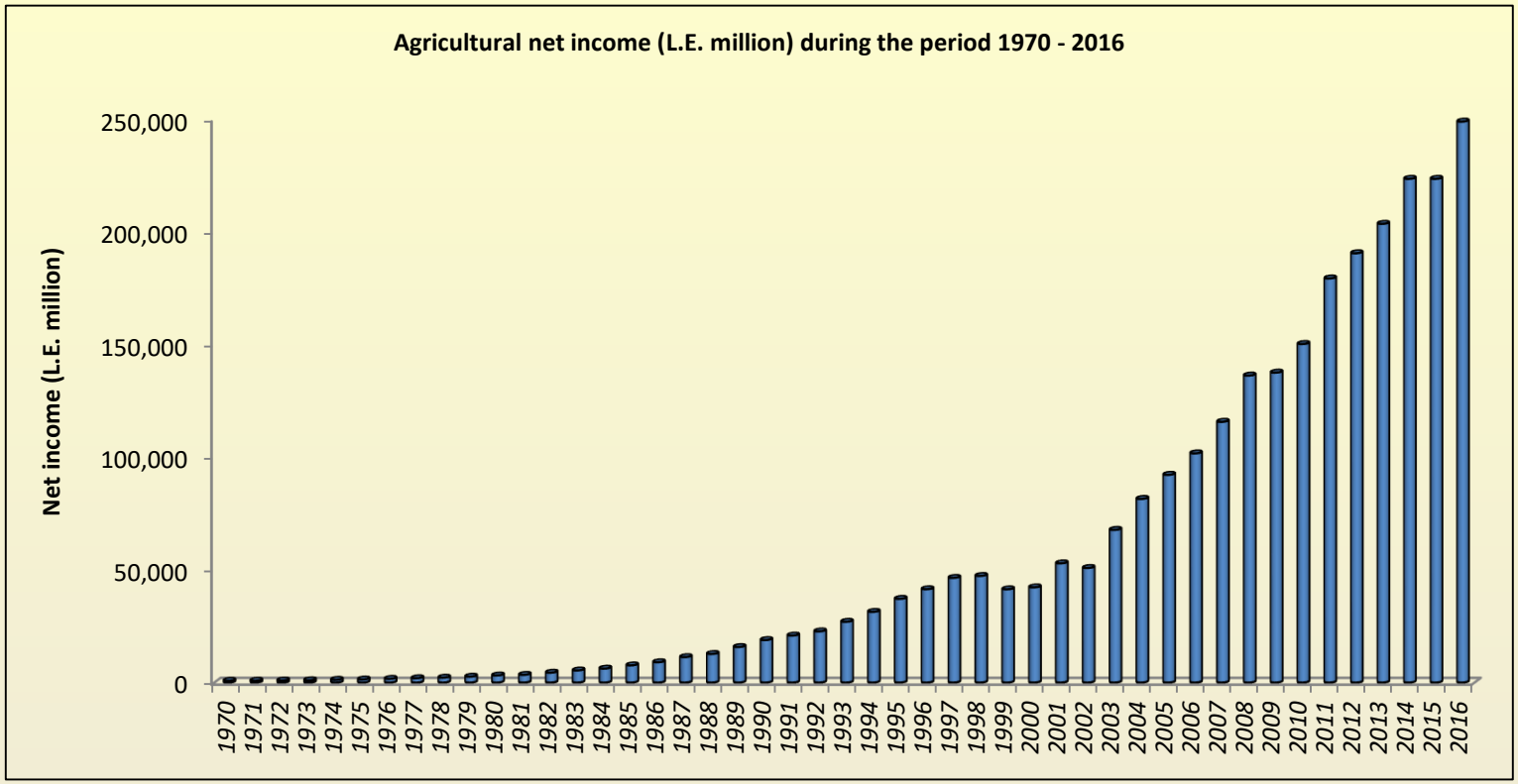
Source: Ministry of Agriculture and Land Reclamation – Economic Affairs Sector – Bulletin of The Agricultural Statistics – different numbers







Source: Ministry of Agriculture and Land Reclamation – Economic Affairs Sector – Bulletin of The Agricultural Statistics – different numberS



(47 year)

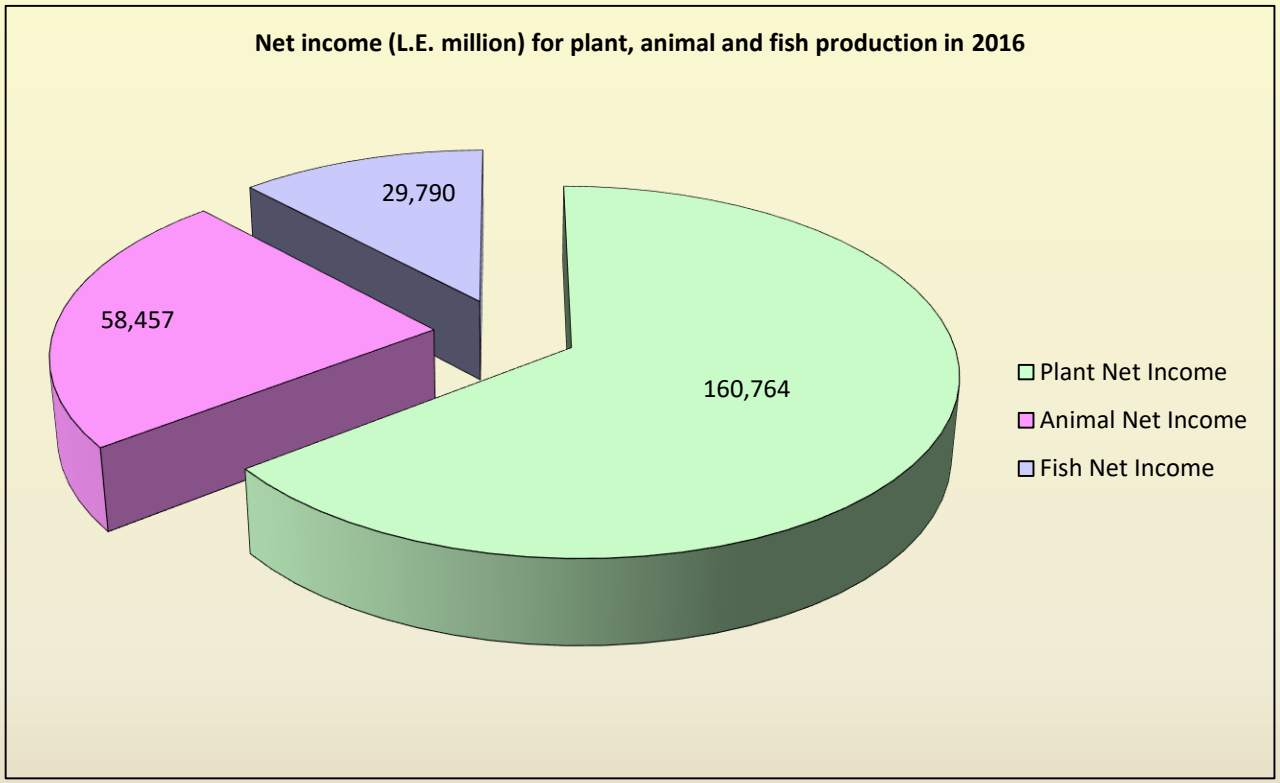
783 million (in 1970)

249,011 million (in 2016),

Value of greenhouse production L.E. 756 million is excluded

لا تشمل قيمة إنتاج الصوب البالغة نحو 756 مليون جنيه .

Source: Ministry of Agriculture and Land Reclamation – Economic Affairs Sector – Bulletin of The Agricultural Statistics- different numbers


Net income (L.E. million) for plant, animal and fish production in 2016
29,790
58,457
160,764
Plant Net Income
Animal Net Income
Fish Net Income

Egyptian agricultural exports amounted to 5 million tons in 2018

The Ministry of agriculture and land reclamation, according to a statement on the Middle East, that the total agricultural exports amounted to 4 million 962 thousand and 354 tons, during the period from January 1, 2018, until December 26, compared to 4 million 740 thousand and 359 tons over the same period last year, an increase of 222000 tones. The Ministry said, total Egyptian agricultural exports for ***13 crops of citrus, potato, onion, strawberry, beans, pepper, cucumber, pomegranate, eggplant, mango, garlic, guavas and grapes, reached 3 million 124 thousand and 933 tons.***

https://www.agricultureegypt.com/News/36894/
عالم الزراعة – شبكة الزراعة المصرية. الجمعة 28 ديسمبر 2018 10:48 ص

Although the improvement of the Egyptian Agriculture sector during the last three decades, but there are many challenges facing agriculture sector under current and future conditions, some of these are:

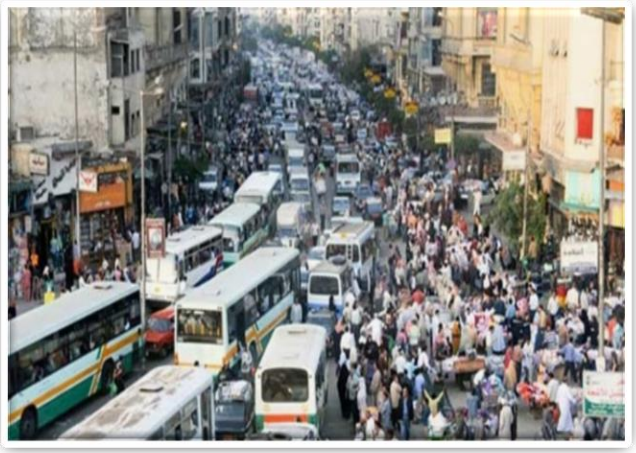
1. Increasing population growth rates
2. Limited agricultural area
3. Scarcity of water resources
4. Increase agricultural input prices
5. Food Prices and Poverty
6. Food Insecurity
7. Encroachment on agricultural land
8. The small size of land tenure
9. Extreme weather events
10. Future climatic changes.

Increasing population growth rates

2018: Egypt's population exceeded 107 million (98 million inside the country)

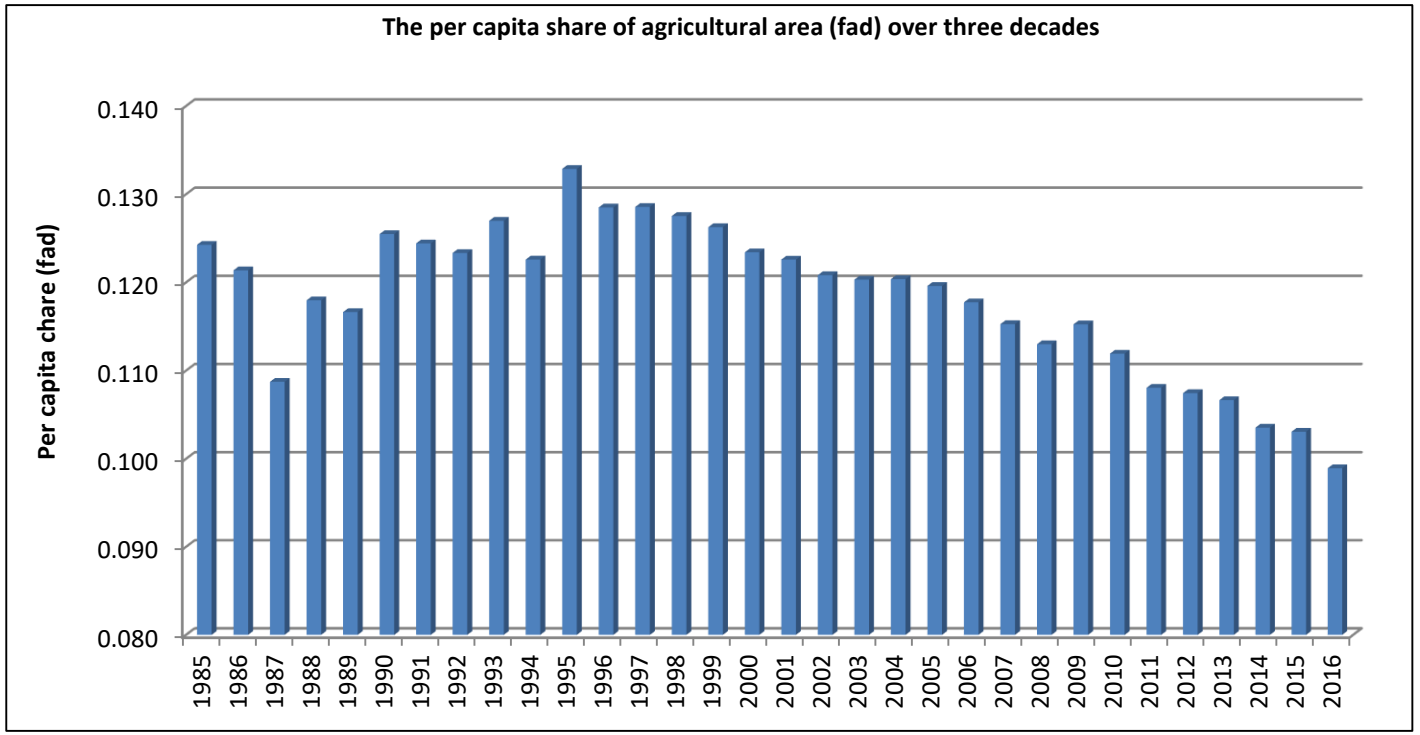
2017: 94.7 + 9.5 = 104.2

2016: Egypt's population inside the country amounted to 92 million



- Source: Ministry of Agriculture and Land Reclamation – Economic Affairs Sector – Study of Food Balance Sheet – different numbers.
- https://arabic.sputniknews.com/arab_world/201812291037884194-%D9%85%D8%B5%D8%B1-%D8%AA%D8%B9%D8%AF%D8%A7%D8%AF-%D8%A7%D9%84%D8%B3%D9%83%D8%A7%D9%86/
- https://www.youm7.com/Tags/Index?id=106035&tag=%D8%B9%D8%AF%D8%AF-%D8%B3%D9%83%D8%A7%D9%86-%D9%85%D8%B5%D8%B1

Limited agricultural area



- Source: Ministry of Agriculture and Land Reclamation – Economic Affairs Sector – Study of Food Balance Sheet – different numbers.

Net Food Consumption for Food Products and average per capita in 2000 and 2016

Products	Net Food (1000 ton)		K.G.Per Year	
	2000	2016	2000	2016
Grand Total	46705	54893	730.4	603.1
Vegetal Products	39428	45115	616.6	495.9
Animal Product	6421	8785	100.4	96.3
Fish Products	856	993	13.4	10.9

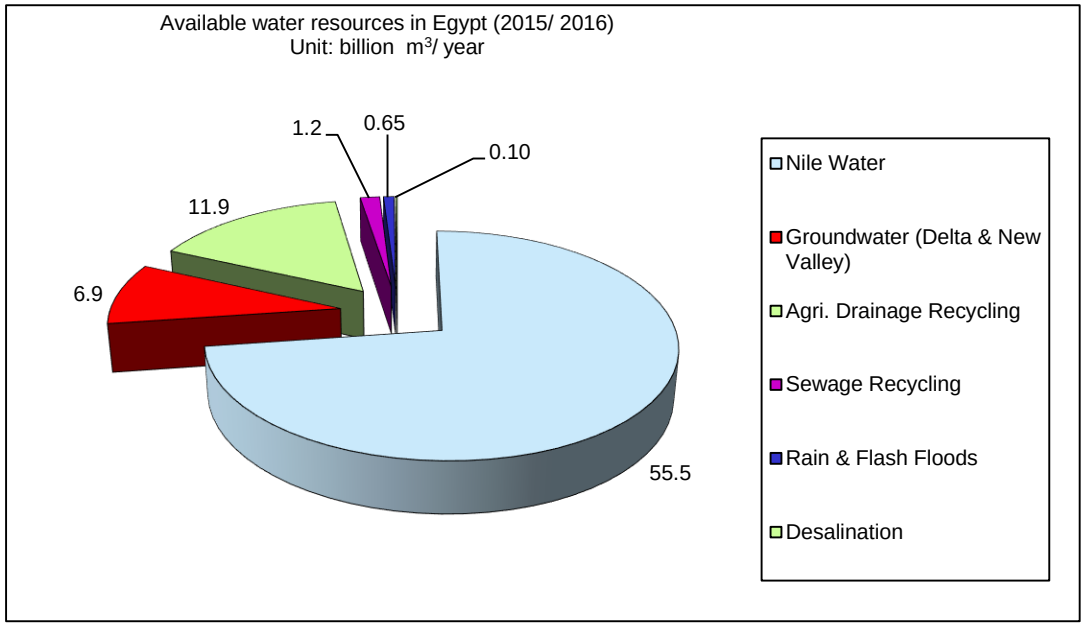
Population: **91023000** in Mid of 2016

Population: **63944414** (2000)

Source : Economic Affairs Sector, 2000, 2016

Scarcity of water resources

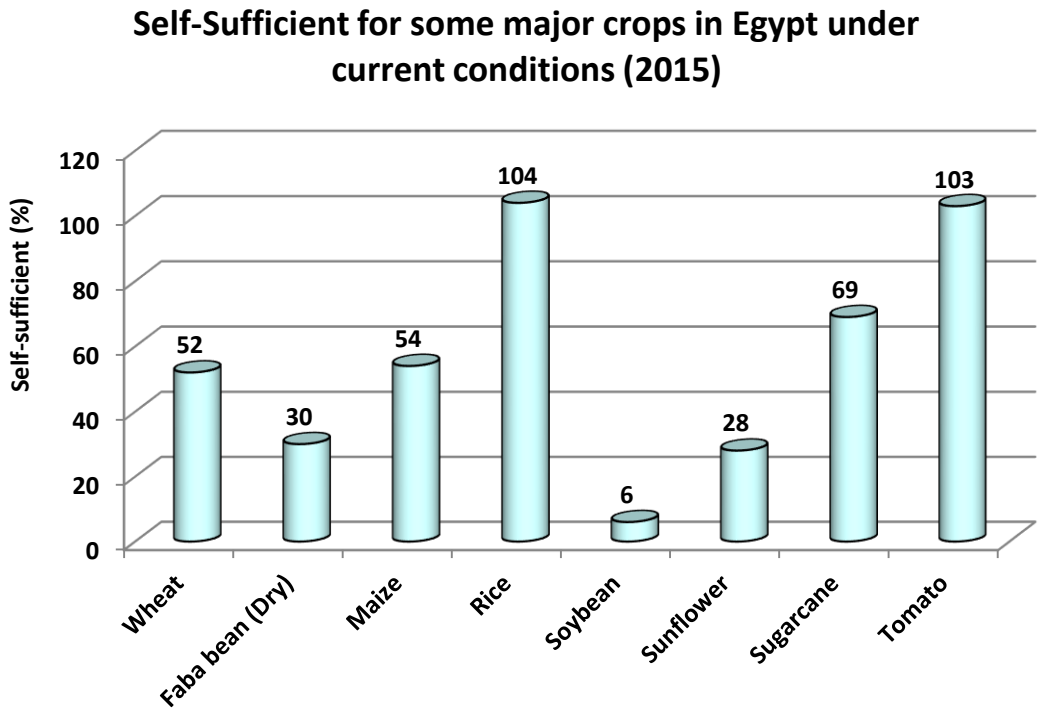
Available water resources in Egypt (2015/ 2016)
(Total = 76.3)



المصدر: وزارة الموارد المائية والرى
الجهاز المركزى للتعبئة العامة والاحصاء
مصر فى أرقام 2016
اليوم السابع

أكد الدكتور محمد عبد العاطى وزير الموارد المائية والرى أن نصيب الفرد من المياه انخفض ليصل إلي حوالي 570 م3 سنوياً عام 2018 ، مقارنة بالمعايير الدولية التى ترى أن يكون نصيب الفرد 1000م3

https://www.youm7.com/story/2018/10/14/%D9%88%D8%B2%D9%8A%D8%B1-%D8%A7%D9%84%D8%B1%D9%89-%D9%86%D8%B5%D9%8A%D8%A8-%D8%A7%D9%84%D9%81%D8%B1%D8%AF-%D9%85%D9%86-%D8%A7%D9%84%D9%85%D9%8A%D8%A7%D9%87-%D9%81%D9%89-%D9%85%D8%B5%D8%B1-%D8%A7%D9%86%D8%AE%D9%81%D8%B6-%D9%84%D9%80/3988900



Source: Ministry of Agriculture and Land Reclamation – Economic Affairs Sector – Study of Food Balance Sheet, 2015.

WEATHER VARIABILITY AND EXTREME WEATHER EVENTS

خسائر بالملايين فى قرى الصعيد بسبب سيول 2016

http://www.journalists.at/?p=36551
http://www.alarabiya.net/
https://m.jo.arabiaweather.com/









http://www.masralarabia.com/
http://www.tahrirnews.com/
http://www.elwatannews.com/news/details/831456
http://www.dotmsr.com/

Agricultural areas most affected by the recent wave of heavy rains (October and November 2015):

- Damanhour Center - Behayra: 80 Fad.
- Khafr Aldawar – Behayra: 13000 Fad.
- These areas were planted by (sugar beet-wheat-potato-artichoke)

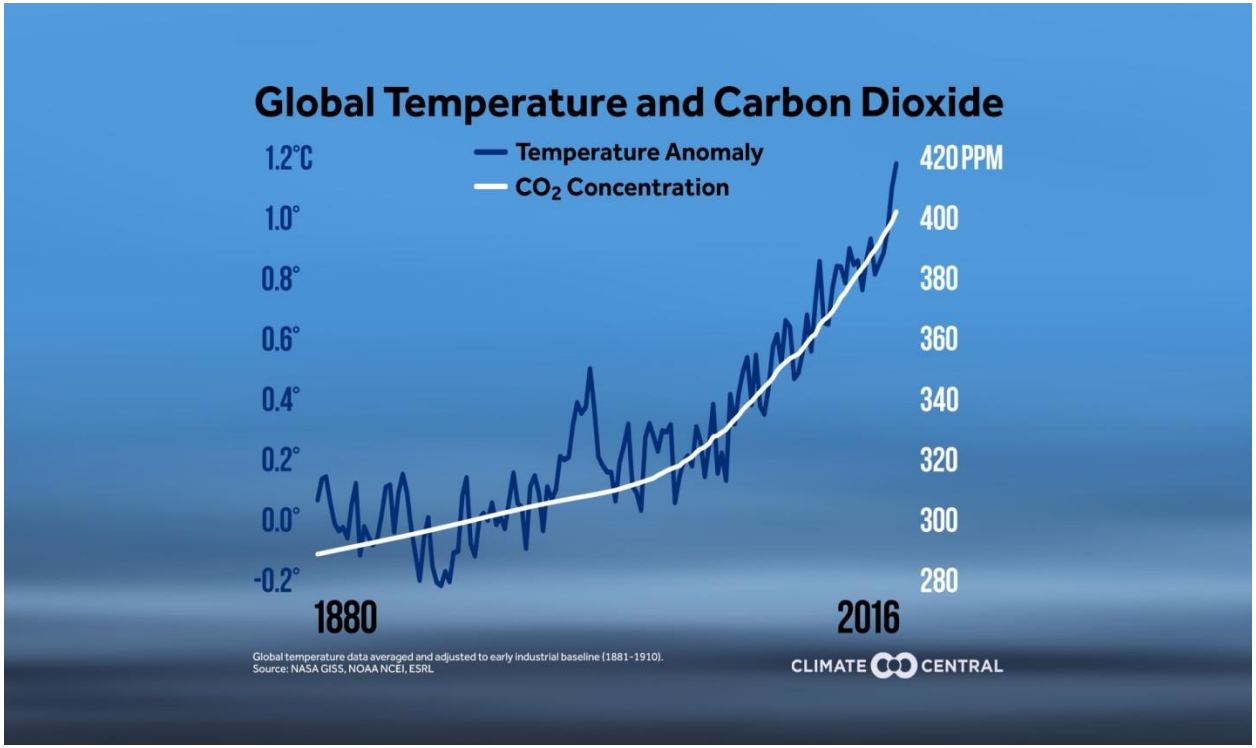
El- Boseily: Jan. & Feb. 2015


2011/04/13
2011/04/13
2011/04/13
2011/04/13
2011/04/13
2011/04/13
2011/04/13

Global climate change phenomena

Global warming reaches 1°C above preindustrial, warmest in more than 11,000 years

https://climateanalytics.org/briefings/global-warming-reaches-1c-above-preindustrial-warmest-in-more-than-11000-years/



https://www.google.com/url?sa=i&rct=j&q=&esrc=s&source=images&cd=&cad=rja&uact=8&ved=2ahUKEwiX34W52bzeAhUPmrQKHSoeAfEQjhx6BAgBEAM&url=http%3A%2F%2Fwww.climatecentral.org%2Fgallery%2Fgraphics%2Fco2-and-rising-global-temperatures&psig=AOvVaw37HTE8OmpL6ZPeAeQ3LL5B&ust=1541487903830383

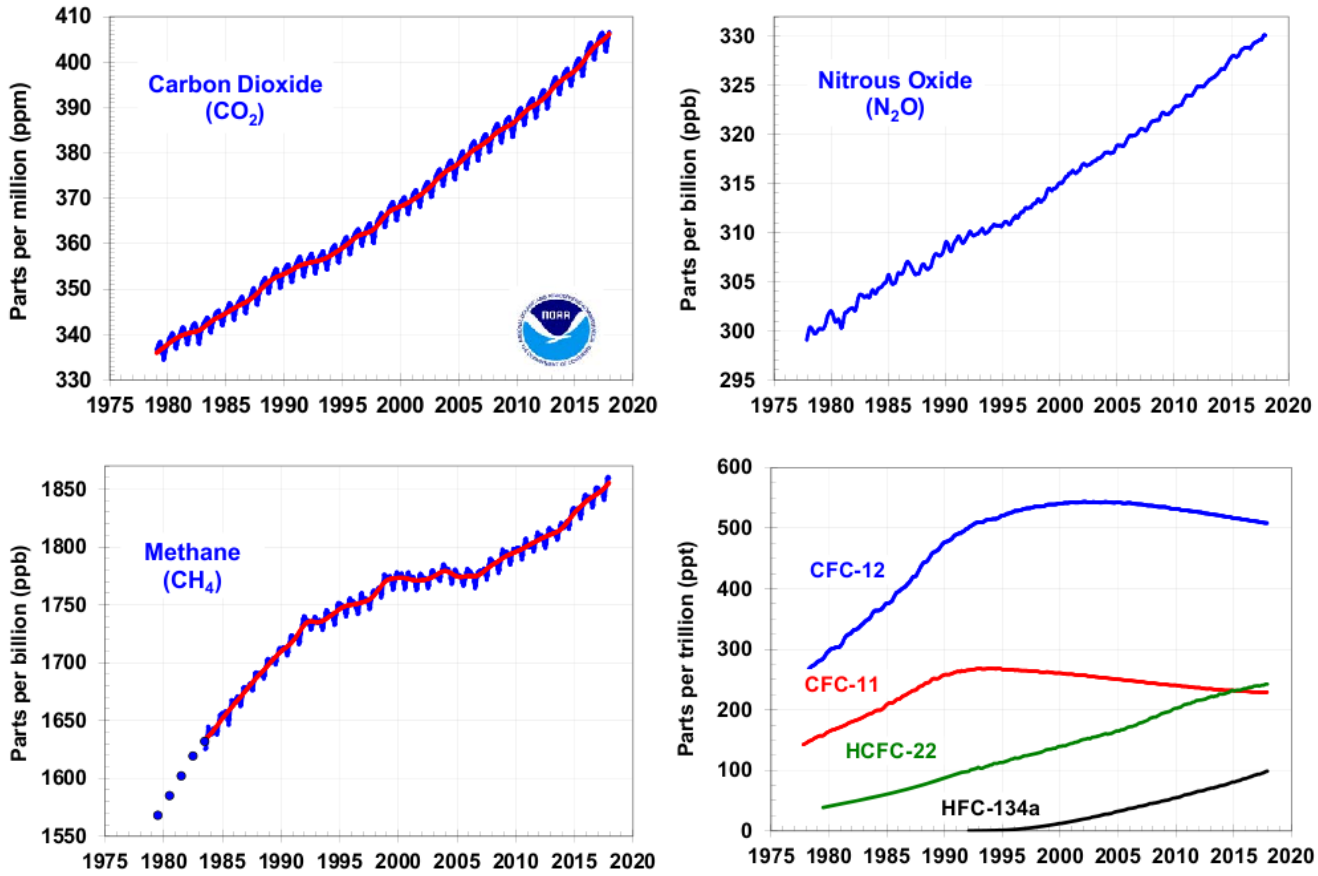


Figure : Global average abundances of the major, well-mixed, long-lived greenhouse gases - carbon dioxide, methane, nitrous oxide, CFC-12 and CFC-11 - from the NOAA global air sampling network are plotted since the beginning of 1979. These five gases account for about 96% of the direct radiative forcing by long-lived greenhouse gases since 1750. The remaining 4% is contributed by an assortment of 15 minor halogenated gases including HCFC-22 and HFC-134a, for which NOAA observations are also shown in the figure (see text). Methane data before 1983 are annual averages from D. Etheridge *[Etheridge et al., 1998]*, adjusted to the NOAA calibration scale *[Dlugokencky et al., 2005]*.

Radiative Forcing

The GHG totals are expressed in CO2 equivalent using the GWP100 metric of the Second Assessment Report of IPCC and include

CO2 (GWP100=1),

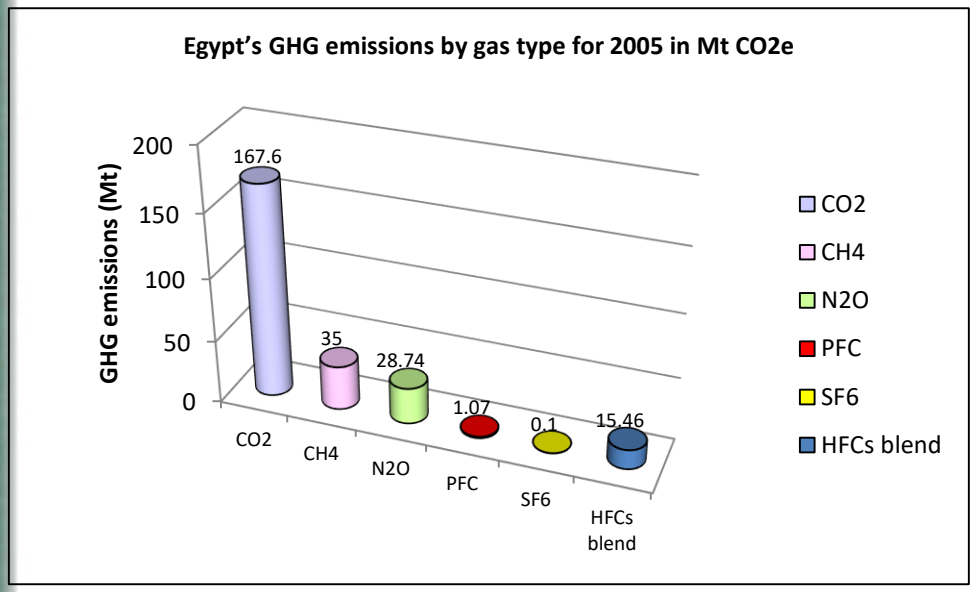
CH4 (GWP100=21),

N2O (GWP100=310) and

F-gases (c-C4F8 GWP=8700, C2F6 GWP=9200, C3F8 GWP=7000, C4F10 GWP=7000, C5F12 GWP=7500, C6F14 GWP=7400, C7F16 GWP=7820, CF4 GWP=6500, HFC-125 GWP=2800, HFC-134a GWP=1300, HFC-143a GWP=3800, HFC-152a GWP=140, HFC-227ea GWP=2900, HFC-23 GWP=11700, HFC-236fa GWP=6300, HFC-245fa GWP=858, HFC-32 GWP=650, HFC-365mfc GWP=804, HFC-43-10-mee GWP=1300, SF6 GWP=23900).

https://data.worldbank.org/indicator/EN.ATM.GHGT.KT.CE?view=map

Greenhouse gas missions from various sectors in Egypt

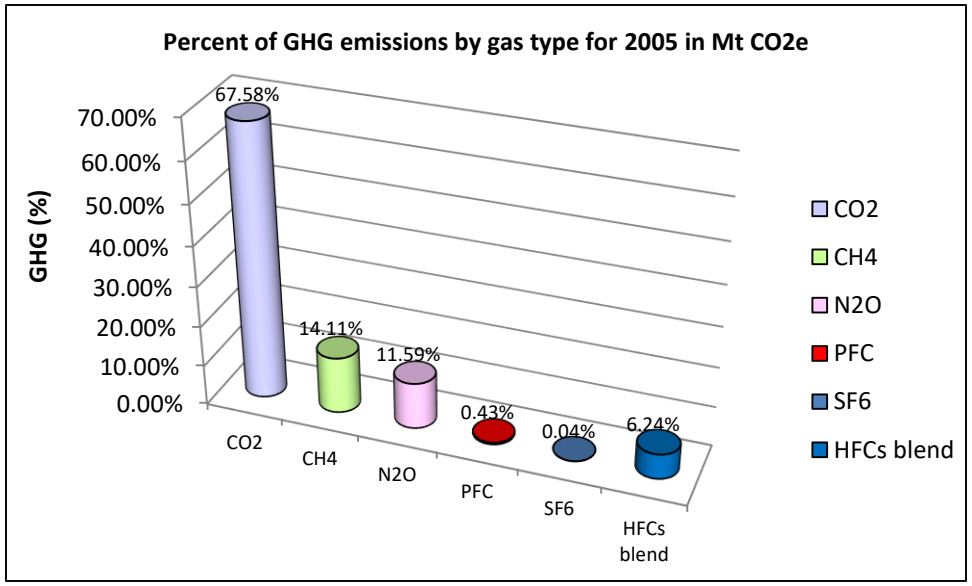


GHGs (world)= 45261Mt CO_2e (2014)

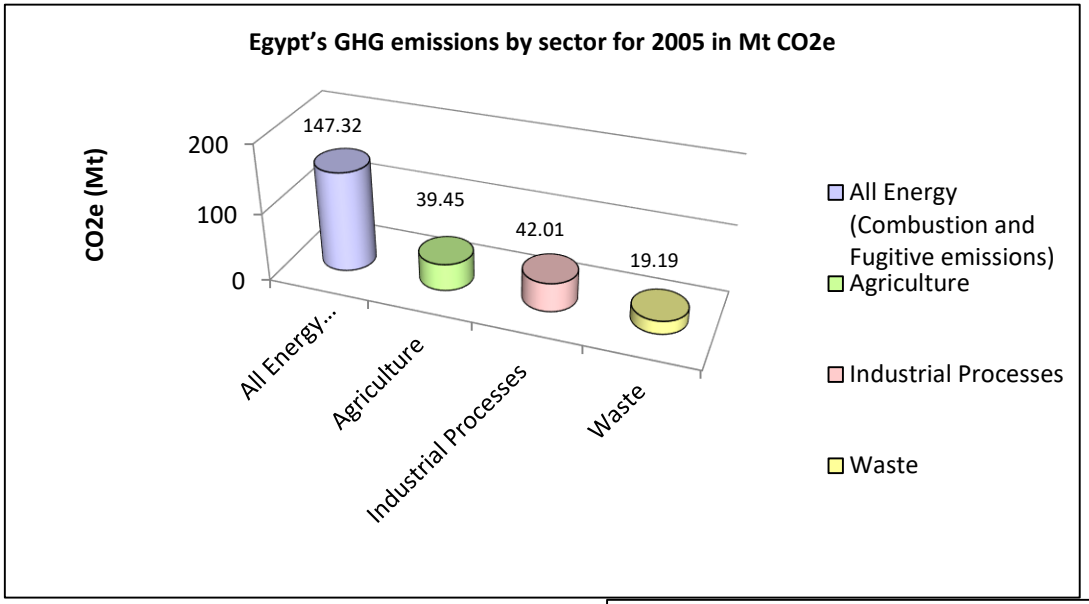
GHGs (Egypt)= 272 Mt CO_2e (2014)

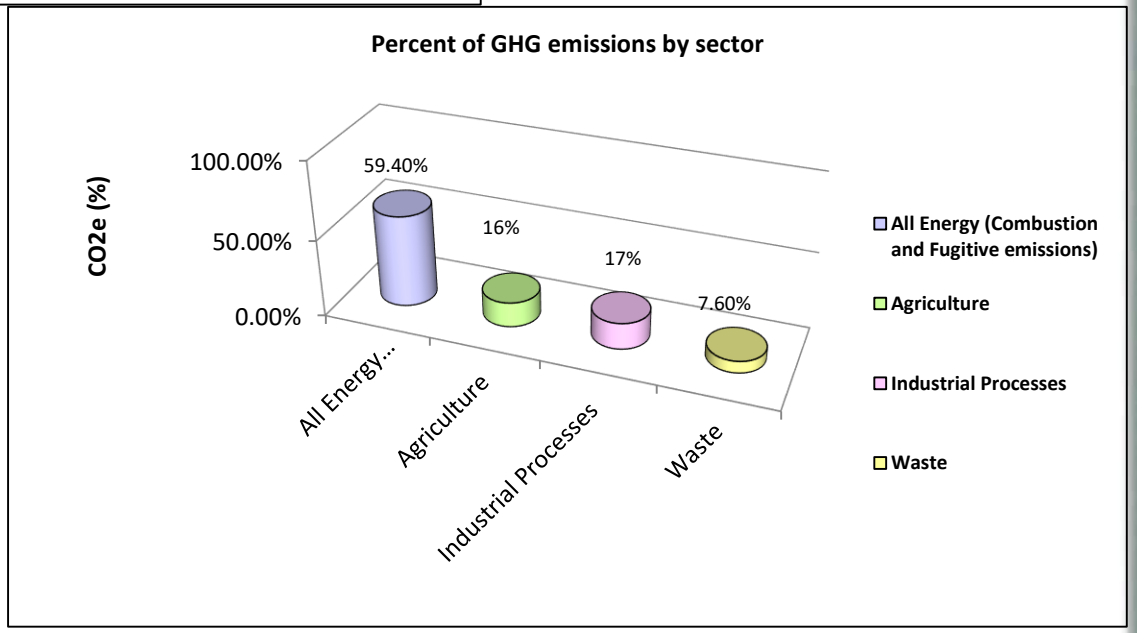
https://en.wikipedia.org/wiki/List_of_countries_by_greenhouse_gas_emissions

GHGs (Egypt)= 247.97 Mt CO_2e (TNC), (2016)



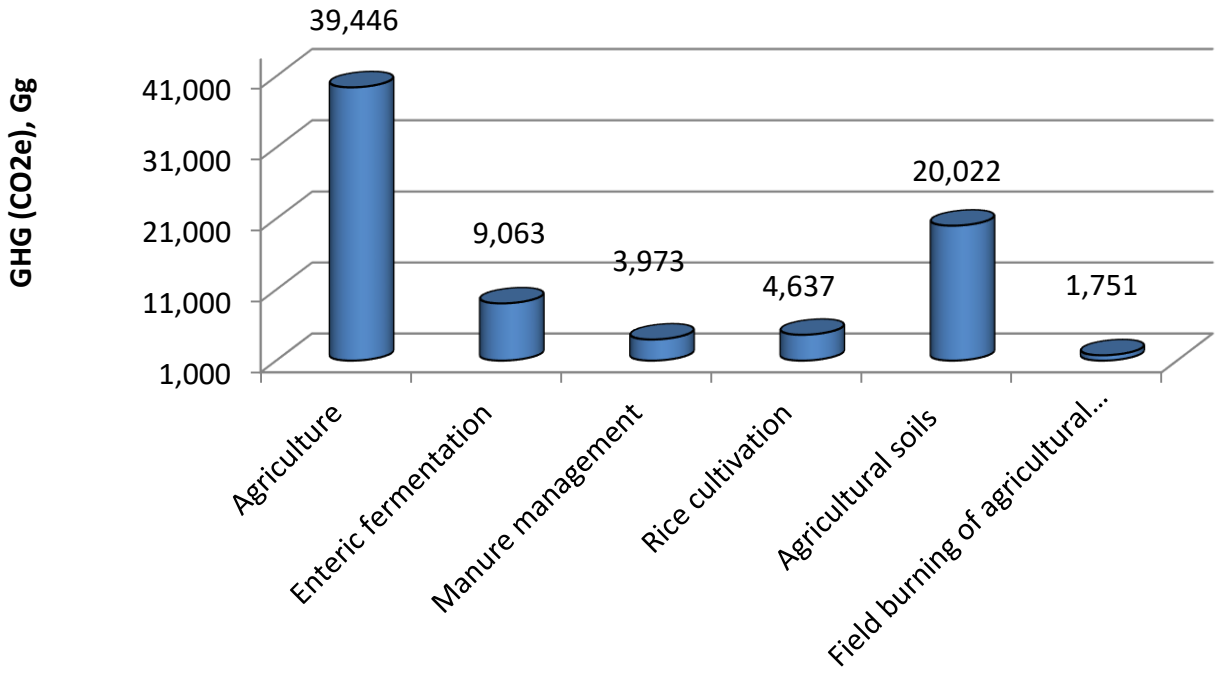
Source: TNC (Egypt Third National Communication- submitted to the United Nations Framework Convention on Climate Change (UNFCCC)), EEAA March 2016





Source: TNC, EEAA March 2016

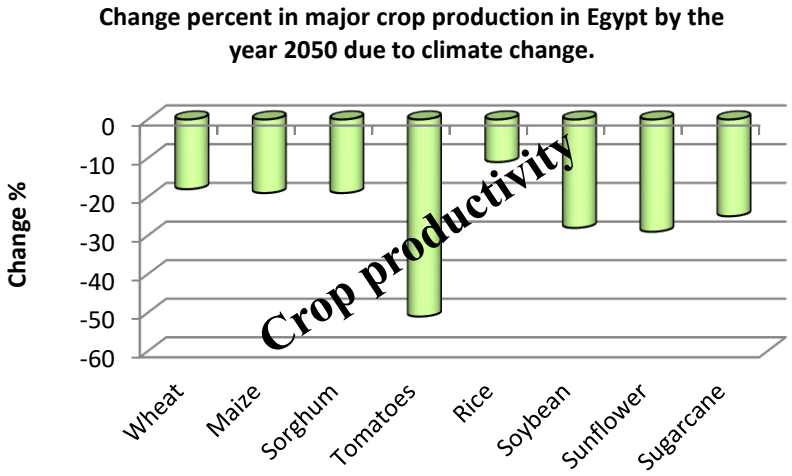
Total GHGs emissions from agricultural sector in Egypt in 2005

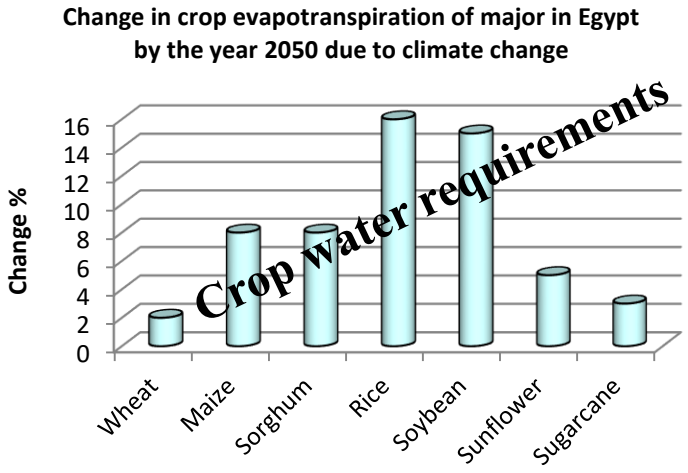


Source: TNC, EEAA March 2016

Impact of climate change on agriculture sector

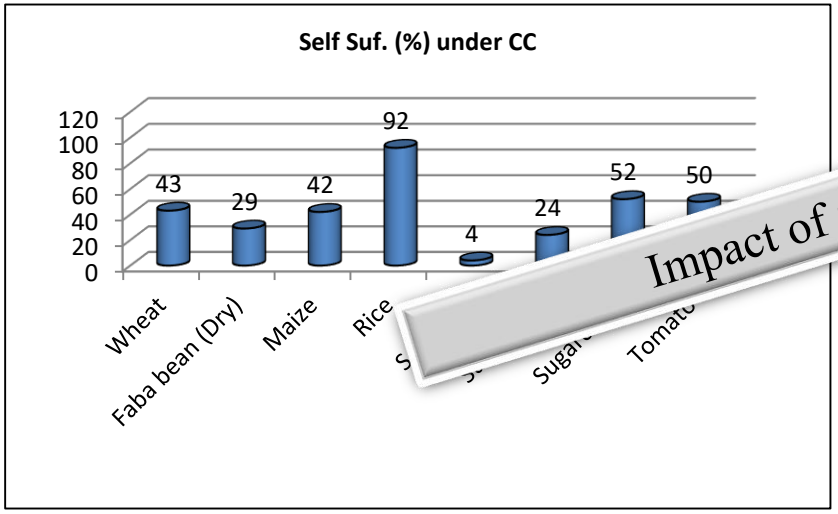
Impacts of CC on agriculture sector

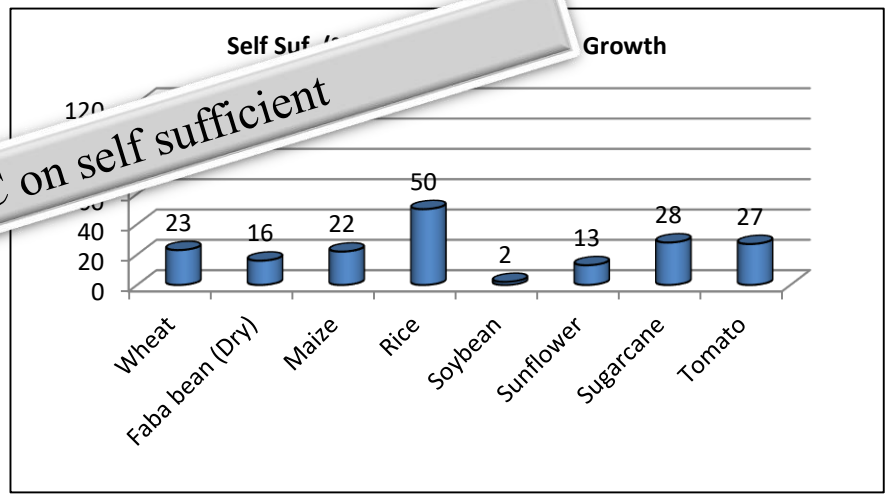




Source crop productivity and water requirements: Eid et al. 1996, Eid and EL-Marsafawy 2002, Abou Hadid 2006, Eid et al. 2006a b, El- Marsafawy2007, El-Marsafawy et al. 2007, El-Marsafawy and El-samanody 2008.

Impact of CC on Livestock and Fish Production





Impact of CC on self sufficient

- Results are shown in graphs are collected and calculated from previous studies.
- Current crop productivity (2015) was obtained from Bulletin of the Agricultural Statistics, September 2016, Economic Affairs Sector. Ministry of Agriculture and Land Reclamation.
- Source of yield and water consumption under climate change: Eid and EL-Marsafawy 2002, Abou Hadid 2006, Eid et al. 2006a b, El- Marsafawy2007, El-Marsafawy et al. 2007, El-Marsafawy et al. 2017.
- The projected population growth in the year 2050 according to the expectations of the Central Agency for Public Mobilization and Statistics (CAPMAS), which is expected to reach about 165 million.

Impacts of CC on Sea Level Raise

Nile Delta
Potential impact
of sea level rise

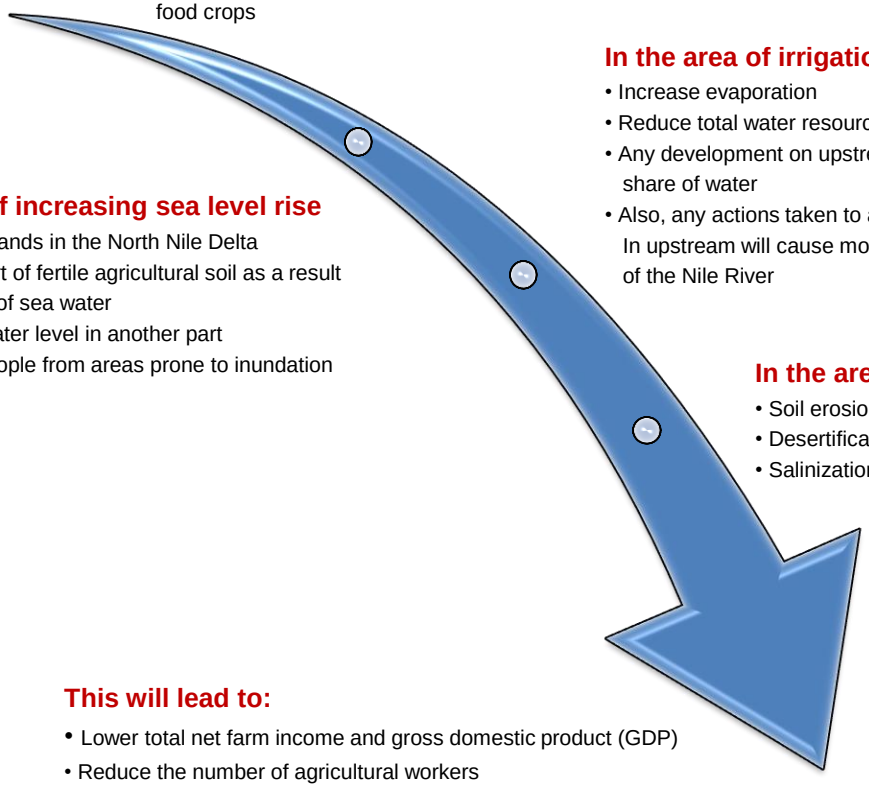
Sources: [illegible] UNEP/GRID Geneva; Prof. G. Sestini, Florence; Remote Sensing Center, Cairo; DIERCKE Weltwirtschaftsatlas.

GRID Arendal UNEP

Summary of the status
“Some challenges facing the agricultural sector under conditions of climate change”

In the area of agricultural production

- Decrease crop yields, animal and fish production
- Increase water requirements for crops
- Increase the spread of pests and diseases
- Increase the gap between production and consumption and the lack of self-sufficiency, especially of major food crops



In the area of irrigation water

- Increase evaporation
- Reduce total water resources
- Any development on upstream will affect Egypt's share of water
- Also, any actions taken to adapt to climate change In upstream will cause more pressure on our share of the Nile River

In the area of increasing sea level rise

- Inundation lowlands in the North Nile Delta
- Salinization part of fertile agricultural soil as a result of penetration of sea water
- High ground water level in another part
- Migration of people from areas prone to inundation

In the area of soils

- Soil erosion
- Desertification
- Salinization

This will lead to:

- Lower total net farm income and gross domestic product (GDP)
- Reduce the number of agricultural workers
- Competition for water between different sectors (drinking and household uses – industry – agriculture).
- Job losses in areas prone to inundation
- Increased overcrowding in some areas
- The spread of disease in areas of crowding and increased unemployment in addition to negative effects on social, economic and health aspects
- In addition to all this, the converting of some crops as fuel (grain-sugar-oil) will lead to increasing pressures on agricultural sector

شكرا لحسن إستماعكم